

In the Claims

1. – 17. Cancelled.

18. (Currently Amended) ~~The laser beam recording system of claim 14 wherein~~ A radiation beam recording system for exposing a photoresist master disc having a photoresist layer formed over a substrate for making a hybrid optical recording disc having a read only (ROM) portion and a writable portion, comprising:

- a) means for modulating an intensity of a laser beam having a wavelength selected to provide activating radiation to expose a pattern in the photoresist layer formed over the substrate of the master disc between a lower intensity for exposing a groove in the photoresist layer and a higher intensity for exposing the groove and a pattern of depressions in the groove in the photoresist layer;
- b) means for frequency-modulating the intensity-modulated beam with a wobble-frequency to cause the exposed groove to be a continuously frequency-modulated wobbled groove;
- c) a modulation control system for controlling the intensity modulation and the frequency modulation of the beam to form a continuously frequency-modulated exposed groove with exposed depressions in the ROM portion of the exposed groove, said continuously ~~continuously~~ frequency-modulated exposed groove having one segment for storing and erasing data and another segment for storing read only data;
- d) means for rotating the photoresist master disc during exposure to the laser beam, and means for radially translating the master disc so that the laser beam incident on the photoresist layer will trace a continuous exposed spiral groove; and
- e) wherein said modulation control system includes a clock, an ATIP generator connected to the clock and operative to generate a frequency-modulating ATIP signal, an EFM generator connected to the clock and operative to generate an intensity-modulating EFM signal in

correspondence with digital data input signals, and means for controlling temporal relationships between and among the ATIP generator and the EFM generator so that respective ATIP signals and EFM signals are temporally correlated to provide concurrent operation of the intensity- and frequency modulation of the laser beam, the means for controlling temporal relationships include a first logic circuit means for creating flag pulses directed from the EFM generator to the ATIP generator, or vice versa, and a second logic circuit means for creating flag pulses directed from the ATIP generator to the EFM generator, or vice versa.

19. (Original) The laser beam recording system of claim 18 wherein the first and the second logic circuits include TTL logic circuits.

Claims 20-26. Cancelled.

27. (Previously presented) A laser beam recording system for making a hybrid optical master disc from which a stamper can be derived for forming a hybrid optical recording disc, the system comprising:

a) a laser which emits a laser beam having a wavelength selected to provide activating radiation to a photoresist layer formed over a substrate of the master disc;

b) a first optical modulator for modulating an intensity of the laser beam between a lower intensity for exposing a groove in the photoresist layer and a higher intensity for exposing a groove and a pattern of depressions in the groove in the photoresist layer, the pattern of depressions coincident with the groove, and the pattern of depressions exposed in response to an intensity-modulating signal;

c) a second optical modulator for frequency-modulating the intensity-modulated laser beam with a wobble-frequency in response to a frequency-modulating signal, the first and the second optical modulators operative concurrently to expose a continuous frequency-modulated groove having portions corresponding to a ROM region of a hybrid optical

recording disc in which the intensity-modulated pattern of depressions is exposed;

d) means for rotating the photoresist master disc during exposure to the laser beam, and means for radially translating the master disc so that the laser beam incident on the photoresist layer will trace a continuous exposed spiral groove; and

e) a laser beam modulation control system including

(i) a clock;

(ii) an ATIP generator connected to the clock and operative to generate a frequency-modulating ATIP signal and means for generating ATIP flag pulses;

(iii) an EFM generator connected to the clock and operative to generate an intensity-modulating EFM signal in correspondence with digital data input signals and means for generating EFM flag pulses;

(iv) logic circuits for providing logic control of temporal relationships between an intensity-modulating output signal of the EFM generator and a wobble-frequency-modulating output signal of the ATIP generator, the logic circuits receiving flag pulses from the EFM generator and directing such EFM flag pulses to the ATIP generator, and the logic circuits receiving flag pulses from the ATIP generator and directing such ATIP flag pulses to the EFM generator;

(v) a function generator for generating a time-varying signal at an output thereof in response to input pulse signals received from a first output of the logic circuits;

(vi) a waveform modifier receiving the intensity-modulating EFM signal from the EFM generator and providing a selectable bias level signal such that an output signal of the waveform generator will have a selected bias level signal and the EFM signal superimposed thereupon, whereby the selected bias level signal provides the lower intensity of the laser beam for exposing the groove in the photoresist layer, and the EFM signal superimposed upon the selected bias provides the higher intensity

of the laser beam for exposing the groove and the pattern of the depressions in the groove in the photoresist layer; and

(vii) a multiplexer operative to provide an intensity-modulating output signal to the first optical modulator in response to a multiplexer input control signal provided by a second output of the logic circuits controller, the intensity-modulating output signal of the multiplexer either being the EFM signal superimposed upon the bias level signal provided by the waveform modifier or being the time-varying signal provided by the function generator in correspondence with the presence or absence of the multiplexer input control signal.

28. (Original) The laser beam recording system of claim 27 wherein the

multiplexer provides the intensity-modulating output signal to an EFM driver which, in turn, actuates the first optical modulator for intensity-modulating the laser beam.

29. (Original) The laser beam recording system of claim 27 wherein the

ATIP generator provides the frequency-modulating ATIP signal to an ATIP driver which, in turn, actuates the second optical modulator for frequency-modulating the laser beam with a wobble-frequency.

30. (Original) The laser beam recording system of claim 27 wherein the ATIP generator and the EFM generator further provide synchronization (SYNC) pulses which periodically synchronize a temporal relationship between the intensity modulation and the frequency modulation along the exposed spiral groove.

31. (Original) The laser beam recording system of claim 27 wherein the

laser beam has a wavelength in a range from 350 to 450 nm, the photoresist layer is formed of a positive-working photoresist material, and the photoresist layer has a thickness in a range from 290-350 nm.

32. (Original) The laser beam recording system of claim 27 wherein the time-varying signal generated by the function generator is a ramp signal.

33. (Original) The laser beam recording system of claim 32 wherein the ramp signal increases linearly with time.

34. (Original) The laser beam recording system of claim 32 wherein the ramp signal increases non-linearly with time.

Claims 35 – 39. Cancelled.